

1 **CLAIMS**

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3 1. A method for controlling presentation of information to facilitate
4 performance analysis for processing, the method comprising:

5 displaying a listing of events that have been captured during processing of a
6 set of commands as well as information regarding the processing of the events;

7 displaying a frame portion that includes information regarding the
8 processing of the set of commands at different chronological points during the
9 processing; and

10 receiving a user selection of one of the events in the listing and selecting
11 which chronological point should be shown in the frame portion based at least in
12 part on the user-selected event.

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14 2. A method as recited in claim 1, wherein the information regarding the
15 processing of the events comprises a value representing how long it took for
16 processing of the events by a processing unit to finish.

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18 3. A method as recited in claim 1, further comprising:

19 displaying a timeline portion including a timeline having a plurality of bars,
20 each bar corresponding to a particular one of the events, wherein a location of
21 each bar on the timeline indicates when the corresponding event occurred relative
22 to the other events during processing.

1 **4.** A method as recited in claim 1, further comprising:

2 allowing the user to select a warning window, to be displayed as the frame
3 portion, wherein the warning window identifies violations of one or more
4 recommendations for programming a processing unit that processed the set of
5 commands.

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7 **5.** A method as recited in claim 1, wherein the processing of the set of
8 commands comprises drawing a frame of video, and wherein the information
9 regarding processing of the set of commands comprises information showing how
10 the frame appears at different chronological points during processing.

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12 **6.** A method as recited in claim 5, further comprising:

13 allowing the user to select one of multiple views to be displayed in the
14 frame portion, wherein the multiple views include a render target view that shows
15 the frame as it is drawn at different chronological points while being drawn, a
16 depth buffer view that shows a depth value for each pixel in the frame at different
17 chronological points while the frame is being drawn, and a wireframe view that
18 shows an outline of each triangle rendered in the frame at different chronological
19 points while the frame is being drawn.

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21 **7.** A method as recited in claim 5, further comprising:

22 allowing the user to select one of multiple views to be displayed in the
23 frame portion, wherein the multiple views include an overdraw view that shows
24 graphically how many times each pixel in the frame is drawn, and a fill rate view

1 that shows how fast a graphics processing unit that drew the frame was running
2 when each pixel in the frame was drawn.

3

4 **8.** A method as recited in claim 5, further comprising:

5 a debugger portion that identifies a pixel shader program or vertex shader
6 program that was executed by a graphics processing unit in drawing the frame, and
7 further identifies input and output register values for each instruction in the shader
8 program as it executed in drawing the selected pixel.

9

10 **9.** One or more computer readable media having one or more
11 instructions that, when executed by one or more processors, causes the one or
12 more processors to:

13 display a first window that identifies events that have been captured during
14 the drawing of a video frame by a graphics processing unit; and

15 display a second window that shows how the frame appears at different
16 points while being drawn.

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18 **10.** One or more computer readable media as recited in claim 9, wherein
19 the first window further identifies, for each of the identified events, a value
20 representing how long it took for drawing of the event by a graphics processing
21 unit to occur.

1 **11.** One or more computer readable media as recited in claim 9, wherein
2 the one or more instructions further causes the one or more processors to:

3 display a third window including a timeline having a plurality of bars, each
4 bar corresponding to a particular one of the identified events, wherein a location of
5 each bar on the timeline indicates when the corresponding event occurred relative
6 to the other events during drawing of the frame.

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8 **12.** One or more computer readable media as recited in claim 9, wherein
9 the one or more instructions further causes the one or more processors to:

10 allow the user to select one of multiple views to be displayed in the second
11 window, wherein the multiple views include a render target view that shows the
12 frame as it is drawn at different points while being drawn, a depth buffer view that
13 shows a depth value for each pixel in the frame at different points while the frame
14 is being drawn, and a wireframe view that shows an outline of each triangle
15 rendered in the frame at different points while the frame is being drawn.

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17 **13.** One or more computer readable media as recited in claim 9, wherein
18 the one or more instructions further causes the one or more processors to:

19 allow the user to select one of multiple views to be displayed in the second
20 window, wherein the multiple views include an overdraw view that shows
21 graphically how many times each pixel in the frame is drawn, and a fill rate view
22 that shows how fast a graphics processing unit that drew the frame was running
23 when each pixel in the frame was drawn.

1 **14.** One or more computer readable media as recited in claim 9, wherein
2 the one or more instructions further causes the one or more processors to:

3 allow the user to select a warning window, to be displayed as the second
4 window, wherein the warning window identifies violations of one or more
5 recommendations for programming a graphics processing unit that drew the frame.
6

7 **15.** One or more computer readable media as recited in claim 9, wherein
8 the one or more instructions further causes the one or more processors to:

9 display a pixel history window that identifies each of the events that affects
10 a user-selected pixel of the frame.
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12 **16.** One or more computer readable media as recited in claim 9, wherein
13 the one or more instructions further causes the one or more processors to:

14 display a debugger window that identifies a pixel shader program or vertex
15 shader program that was executed by a graphics processing unit in drawing the
16 frame, and further identifies input and output register values for each instruction in
17 the shader program as it executed in drawing the selected pixel.
18

19 **17.** One or more computer readable media as recited in claim 9, wherein
20 the one or more instructions further causes the one or more processors to:

21 display a mesh debugger window that includes information about a single
22 mesh of the frame, and a table that shows the attribute values for each vertex in the
23 mesh as well as an output of a vertex shader program for each vertex in the mesh.
24

1 **18.** A system comprising:
2 a memory;
3 a processor coupled to the memory; and
4 a plurality of instructions stored in the memory and executed by the
5 processor to present a user interface to enable a user to view information regarding
6 a frame of video, the user interface comprising:

7 an events window that identifies events that have been captured
8 during the drawing of a video frame by a graphics processing unit, and
9 a frame window that shows how the frame appears at different
10 chronological points while being drawn.

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12 **19.** A system as recited in claim 18, wherein the graphics processing
13 unit is part of another device coupled to the system.

14
15 **20.** A system as recited in claim 18, wherein the user interface further
16 comprises:

17 a timeline window including a timeline having a plurality of bars, each bar
18 corresponding to a particular one of the identified events, wherein a location of
19 each bar on the timeline indicates when the corresponding event occurred relative
20 to the other events during drawing of the frame.